



WATER RESOURCES RESEARCH GRANT PROPOSAL

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Title: Identifying High-Infiltration and Groundwater Recharge Areas

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Abstract: In urban and urbanizing areas across the country, development generally replaces unpaved surfaces with impervious surfaces. These changes increase stormwater runoff and reduce groundwater recharge, which can create flooding and water supply issues. Infiltrating stormwater is a practice that can improve runoff quality, reduce runoff quantity and promote groundwater recharge.

Communities that are faced with rapid population growth and associated development pressure need to know the locations of high-infiltration and groundwater recharge areas when making land use decisions. This information is especially important for communities that rely on groundwater as the primary drinking water source. However, identifying high-infiltration and groundwater recharge areas is still an active area of research.

Knowledge of the locations of high-infiltration and groundwater recharge areas would be valuable to

multiple audiences. Local land use planners could use the information to identify areas in which to encourage or restrict development. Developers could use the information for layout designs and zoning authorities could use this information when reviewing subdivision proposals. Engineers and architects could use this information in designing stormwater management plans and siting houses and other impervious surfaces.

The objective of the proposed research is to develop and test a GIS-based model to identify relative infiltration and groundwater recharge rates. The proposed research will be conducted in Dane County, Wisconsin, a rapidly urbanizing community which relies on groundwater for its drinking water. The model will be calibrated and validated by measuring infiltration at locations representing both small (comparable to the size of a development parcel) and larger scales (such as a township or watershed) throughout the county. Field results will be used to improve understanding of the relationships between the data sources and infiltration and recharge rates, and to refine the model based on land use history and other factors which may alter predicted values at specific sites.

The outcome of the proposed research will be a county-wide map of relative infiltration and groundwater recharge rates. These data will be made available to the public in hard-copy format and through an interactive mapping website. An extension publication will also be developed. In addition, we will develop an interactive website that allows users to compare the impact of proposed development scenarios on infiltration and recharge rates. Finally, the results of the proposed research will be used to refine inputs to the Dane County groundwater model so that that it accounts for the impact of future construction on future water availability.

Although the proposed research is restricted to a single county, it addresses an issue that is of national concern: the impact of development on both water quality and quantity. The methodology for identify high-infiltration and groundwater recharge areas in Dane County could be used by other communities that are experiencing development pressure and water quality and quantity concerns.

[U.S. Department of the Interior, U.S. Geological Survey](#)

URL: <http://water.usgs.gov/wrri/06grants/national/2006W1146G.html>

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